



Article

# Climate Emergency Adaptation and Sustainable Management Strategies in Rural and Agricultural Landscapes

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Received: 30 September 2020; Accepted: 5 November 2020; Published: 7 November 2020



**Abstract:** This paper discusses the way in which climate emergency-related strategies and the concepts of climate adaptation, sustainability and governance are being introduced into rural and agricultural landscapes. To investigate environmental impacts on climate change, it uses examples from the ‘Landscape Observatory’ (Catalonia) and the ‘Room for the River’ (the Netherlands) landscape programmes. This research concludes that a communication strategy strongly supported by policies, legislation and governance structures, in conjunction with a wider understanding of the role of landscape, results in significantly improved responses to deal with the challenges of the climate crisis in rural and agricultural areas.

**Keywords:** climate adaptation; rural infrastructure; policy; governance; water management; agriculture; landscape; climate emergency; crisis

## 1. Introduction

Dealing with the climate crisis is often perceived as a race with an ‘intangible’ rival. The impact of this on the landscape, agricultural land and our cities is clearly damaging and, in some cases, irreversible. Landscape and agricultural land are frequently thought of as ‘areas of activity’ which relate to environmental issues, but are often not given the significance they deserve to our lives, food production, water purification, air quality and nature and, therefore, our health, culture and society. This paper contends that the lack of a holistic sustainable vision for the landscape and agricultural land is already having adverse consequences related to the environment and our lives. A more effective landscape-scale approach could demonstrate how such issues can be addressed in dealing with the climate crisis and enhancing landscape identity for a region. Introducing a new way of thinking that merges landscape design with more traditional decision-making processes in infrastructure developments has the potential to result in a hybrid or completely new strategic methodology that will make the integration of environmental and design qualities much more successful in large scale schemes.

Examining a number of pioneer projects across Europe, the broader research identifies new design methodologies and decision-making strategies that demonstrate a successful transition to carbon neutral communities. Looking through the lens of rural landscapes, agriculture and the impact of environmental challenges, this paper aims to demonstrate how the concepts of climate emergency and design are introduced and dealt with in the rural context. Having identified a wider body of landscape schemes, this paper examines three cases where climate adaptation and awareness are investigated in

agricultural and rural land. It identifies the best practices that have successfully dealt with the landscape and policy on a strategic scale while focusing on climate adaptation, awareness and decision making and demonstrates the key steps and framework necessary for successful sustainable management. The cases presented here have designed and developed innovative individual processes that emphasise the importance of rural infrastructure and the reasons why such areas cannot be overlooked from a climate emergency point of view. The projects are selected for their innovative methods on policy and decision making as well as their effective strategic management and participatory processes.

The holistic vision and pioneering methods used by the individual project frameworks reveal that rural and agricultural land is able to deliver vital solutions in the context of large-scale environmental challenges while giving a boost to the economy and community, as long as this is integral to the broader ethos of the community and management team.

The Noorwaard project part of the Room for the River Programme (the Netherlands) (the Room for the River Programme is a climate driven regional landscape design, implemented to address the problem of serious flooding in the Netherlands due to rainfall and rising sea levels), demonstrates how a rural landscape responds to the climate emergency and how appropriate design creates a nature reserve while preserving the agricultural land. The cases of Lluçanès and La Cerdanya, collaborative projects of the Landscape Observatory in Catalonia (Spain) (the Landscape Observatory of Catalonia (Spain) is an advisory body on landscape issues for the government of Catalonia and the Catalan society; it was established to implement the European Landscape Convention (ELC) and it has succeeded in creating a landscape-oriented culture in the region), examine agricultural landscapes with a special character related to their topography or location and how these areas can enhance landscape awareness.

## 2. Methodology

The wider research supporting this paper explores the role of low carbon in landscape-based regional strategies and examines how policy and legislation can shape decisions and change perceptions of the project management team in order to deliver more sustainable landscape infrastructure schemes. This wide scope incorporates live projects giving an analysis of design, sustainability and sense of place and the way in which these elements impact on project delivery, decision making and management. The research examined the conceptual, design and, where possible, implementation stages of a pilot study and three case studies selected to demonstrate the different stages of 'Identification', 'Socialisation or Dissemination' of the project concept and ways in which truly sustainable strategic schemes can be successfully delivered ('Implementation'). The Identification phase focuses on design and environmental elements of infrastructure projects, while the Socialisation phase conducts an in-depth analysis of landscape and environmental values and the ways in which landscape awareness and social engagement impact on landscape management. The third methodological stage is the Implementation, where delivery mechanisms are presented which identify how climate emergency adaptation measures can control environmental impacts. The case studies used in this paper belong to the Socialisation and Implementation phases and demonstrate innovative methods related to climate emergency, policy and social engagement in landscape spatial strategies and best approaches on how these can be used in future developments.

This paper explores rural infrastructure with climate adaptation goals, land management, awareness and policy alterations. Noorwaard falls into the 'Implementation' phase and the Lluçanès and La Cerdanya belong to the 'Socialisation' phase of the broader methodological concept.

Research methods consisted of collaboration with the on-the-ground project teams, field visits to project sites, examination of current and past documentation, interviews with senior project team members and observations of team collaboration. The full method is set out in a previous paper [1]. The data collection includes drawings, maps, technical documents, visual and audio material from the field visits to each project, texts, notes and interview transcripts that have been analysed after each study visit.

### 3. Climate Emergency and Rural Infrastructure

The climate emergency debate is becoming increasingly important to society and policymakers; and with legitimate reasons, since the latest report from the Intergovernmental Panel on Climate Change has stated that the impacts of 1.5 °C global warming are likely to replace land use change as the major driver of future ecosystem change [2]. The number of countries that have officially declared (having passed a binding motion in their countries) a climate emergency rose from 1 in April 2019 to 30 in September 2020, according to the Climate Emergency Declaration [3].

It is apparent that topics related to environmental challenges are at the forefront of public interest, and more institutions and organisations engage daily with the rapidly-growing challenge of climate change. However, the impacts of this crisis on the landscape, rural areas and agriculture are often less-frequently discussed, giving the impression that they are of secondary importance. The current literature contains only a few exceptions that have sporadically touched upon the issue. Gossop [4] explained that “the world’s ability to absorb carbon is being steadily reduced through massive tree felling and other land use changes”, giving a clear message that the climate crisis is a direct threat to living organisations and our surrounding land. Intensifying that message, Hanna et al. [5] suggested that the climate emergency is expanding from Australia to the Mediterranean, mainland Asia and the Americas, affecting the planet’s rural communities and landscapes. Therefore, it is becoming apparent that no infrastructure is safe, and that the climate emergency is not just an urban phenomenon, but a risk spreading across continents and countries. Emphasising the local scale and the importance that this has on the fight to cope with a changing climate, Torres and Pinho [6] make clear that “climate change is a global threat but local and individual actions are essential to mitigate it”.

Landscape and rural infrastructure are directly affected by the climate emergency, but the ways in which such a challenge is taking shape vary significantly. Agriculture is being affected by drought and flooding, extreme heat events and sudden variations in temperature and humidity, while severe weather events such as storms, hurricanes, and flash flooding decrease crop production and reduce stock, as do events exacerbated by weather, such as drought leading to widespread wildfires [5]. Part of the land-use challenge for agriculture is the global nature of the contemporary food chain, the crop demand and the ways in which we engage with our rural landscapes. Instead of an area that can be celebrated and embraced by the wider community, farming landscapes are often separated “geographically and mentally” from their surroundings because of their principal role in contributing to the global food system [7]. The necessary increase in scale removes traditional small-scale landscape features and reduces community interaction. The distance created in the food production system benefits global actors instead of local agricultural models, even though the latter are often more sustainable [7]. Furthermore, a ‘distanced model’ of the food system separates the food production from its impact on the landscape, making it difficult to calculate the climate footprint but also estranging it from the local society, allowing global corporations to make key decisions on crop production [8] and consumption.

#### *Policy as an Advocate for Sustainable Rural Landscape Schemes*

Over recent years, although sustainable communities and the landscape have received significant attention across much of the world, there is still neither a coherent planning system nor a clear and workable policy that creates links between agricultural land, nature and the significance that landscape has to society and the climate emergency. Clapp [7] mentioned that “policy-making for more sustainable agricultural landscape is anything but neat [ . . . ] and will require action on multiple scales”. With this paper’s focus on strategic climate adaptation in rural schemes and decision making, the identified need for national and international-level interventions and governance frameworks appears to be very timely [5,7]. It seems that the interest in the way in which agricultural land can be more widely appreciated by, and engaging for, society is gaining momentum, while further steps are being taken in order to revisit a close relationship with nature and build an environmental ethos that has somehow been lost—even though most of us claim to be interested in it. Especially with

the COVID-19 crisis still developing, the environmental, economic and climate impact of our daily activities has been given even greater prominence [9,10], highlighting the significance of ecosystem services and the need that communities have for open and food-growing spaces.

The fact that governance frameworks do not engage with environmental and social problems from the very beginning of a project design and planning process [1] creates challenges that merit further investigation. Innovative examples with visions on how rural landscapes can demonstrate benefits mitigating against the climate crisis are emerging [11], allowing professionals and farmers to adopt strategies and actions that fall into the resilience and mitigation agendas while having simultaneous economic and social benefits for their communities. Therefore, the argument that design and management can integrate agricultural and ecological strategies in order to increase resilience [12] and demonstrate the importance of rural landscapes is of great value.

#### 4. A Landscape Design Response to the Climate Crisis and Awareness for Rural Areas

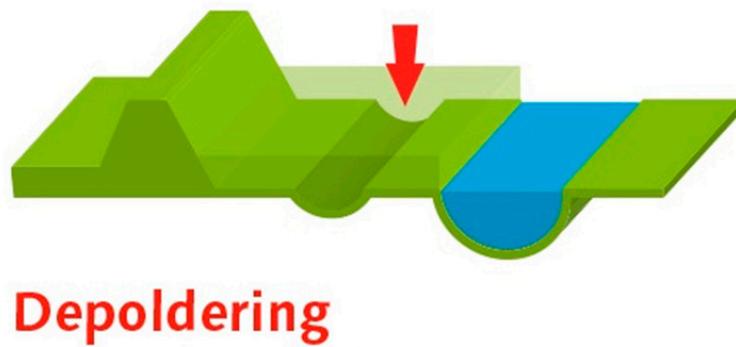
This section explores innovative schemes located in rural areas that have found ways to engage with society and introduce the importance of climate awareness and hydrological efficiency. Terms such as climate change, emergency and environmental challenges are used more often; however, it is not always easy for people to understand something which they cannot immediately see [1]. This is when landscape schemes and dissemination methods can really empower this message. The projects discussed here focus on rural landscape, climate crisis and awareness and demonstrate how through management, decision-making processes and climate focused design, it is possible to infuse environmental messages throughout a large part of a community during their everyday use of the landscape.

The Room for the River Programme (Rftr) is a climate adaptation strategy conceptualised and implemented in the Netherlands, addressing water safety and spatial quality in 34 different locations across the country. For the purposes of this paper, the rural location of one project, Noordwaard, will be discussed. The Room for the River was initiated as a policy in 1996 by the Dutch government and emerged from the serious flooding that affected the Netherlands in 1993 and 1995. It had a duration of 10 years, with most of its projects delivered by 2016.

The Landscape Observatory is based in Catalonia, focusing on landscape awareness, community engagement and the way in which landscape is perceived by decision makers and the public. It was based on the European Landscape Convention (ELC) and aimed to work on the value of the landscape and influence the way in which governmental decisions are taken in relation to the environment and the land. The two projects selected here (Lluçanès and La Cerdanya) demonstrate how policy and public participation benefit the perception of rural landscapes. The concept and process of the Lluçanès Landscape Charter was presented in January 2015 and is being run with the support of the Lluçanès consortium and the Diputació de Barcelona (Barcelona provincial council). The La Cerdanya project was initiated in relation to the 'Cerdanya Cross-border Landscape Plan' since 2012 with one of its main outputs, the 'Mapa transfronterer', presented in 2017 [13].

##### 4.1. The Case of Noordwaard: A Rural and Agricultural Landscape Project

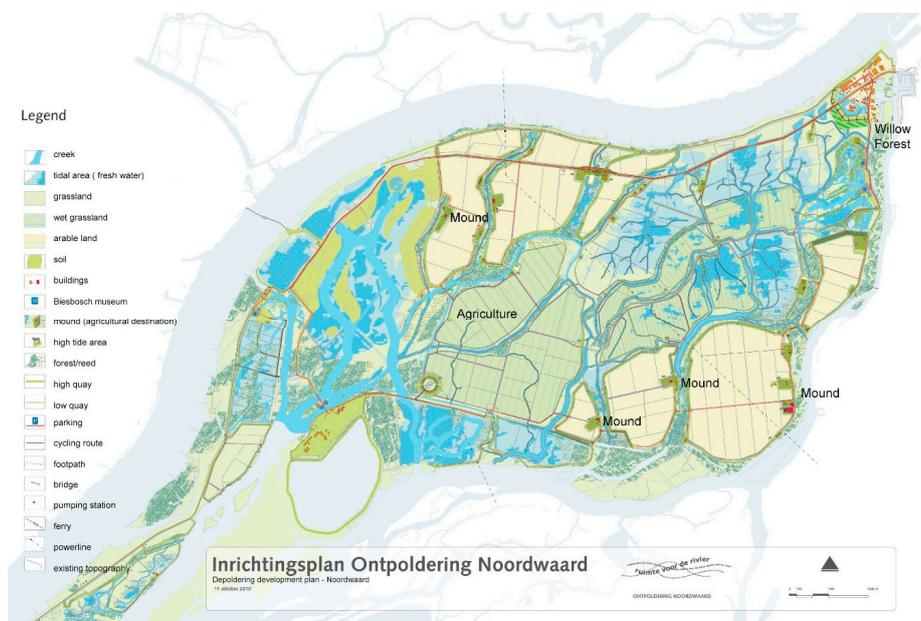
Noordwaard, situated in the municipality of Werkendam, is the largest project (in square metres) of the national-scale Rftr strategy. The project concept introduces a low-carbon vision while creating reassurance that rising water levels across the country could be appropriately managed. Using nine different hydrologically special measures across various locations, the Rftr scheme has managed to create more room for four of the major rivers of the country (Waal, Rhine, Lek and Maas), while, at the same time, enhancing social and economic benefits for the participating areas. A process called depoldering (flooding the polders, which are low-lying tracts of land enclosed by dykes) was followed for the rural location of Noordwaard, where a dyke along the river was moved outwards (Figure 1) so that water has room to flood during periods of high-water levels.



## Depoldering

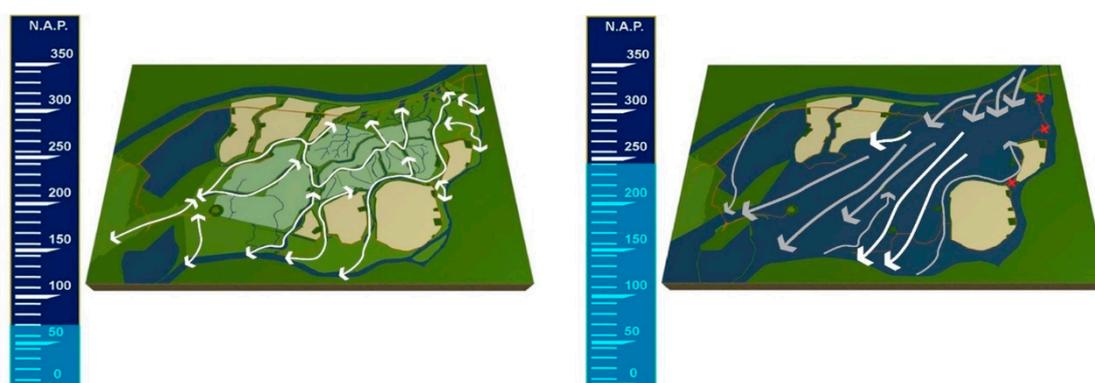
**Figure 1.** Depoldering. One of the nine methods to make room for the Dutch rivers. Image courtesy Rijkswaterstaat.

Noordwaard is located in an agricultural area (Figure 2) that tends to flood, making it challenging for farming and infrastructure. However, the concept and vision delivered by the RftR has managed to overcome the water management challenges, and also to create a new nature resort; it has received an international landscape award in infrastructure in 2019 [14]. This project aims to protect against flooding, celebrate natural environment and offer various recreational activities to visitors and locals, while maintaining a strong focus on the current agricultural fields and cattle in the area. The technical manager of the scheme, Annika Hesselink, revealed that the vision was based on the ‘building with nature’ concept [11], providing hydrological efficiency, but also allowing farming to continue in the area. The decision to move the main dyke and decrease the protected area, allowing the river to flow more rapidly into the sea, was not taken lightly, as this would create several challenges for farming and cattle breeding in Noordwaard. However, through a series of design decisions informed by consultations with the farmers and stakeholders of the region, the depoldered area has now been converted to a beautiful piece of landscape where agriculture is part of a natural resort that allows cycling, boat visits and contemplation as well as being the location for the Biesbosch Museum, featuring the surrounding recreational area.



**Figure 2.** Masterplan of the depoldering of Noordwaard illustrating the water, agricultural areas and mounds where housing has been established. Image courtesy of Annika Hesselink and Rijkswaterstaat provided in Dutch (English translation of the legend by authors for the purposes of this paper).

The significance of this project in relation to agriculture is demonstrated when it is understood that, after the ‘depoldering’, the catchment area is under water several times a year with a regular tide flow from 40–70 cm and flooding scenarios where agricultural polders can be under 290 cm of water (Figure 3). In Noordwaard, the water flows into the polder from the south side; however, as shown in Figure 3, when water reaches the 2-metre level, the river levee on the north side will overtop and the river Rhine will flow through the polder. Aiming to be a natural area that can reintroduce water and flood dynamics, Noordwaard is the outcome of a very bold sustainable design [11]. The discharge capacity of the New Merwede would be increased to allow an occasional high water bypass, thus protecting the urban areas of Rotterdam and Dordrecht [15]. By depoldering the dyke and introducing the agricultural area of Noordwaard to new water dynamics, major risks were revealed for the livelihood of the residents and the ways in which agriculture was going to be possible in the area. Instead of following strict protection methods, this scheme has pledged to develop innovative concepts, and managed to create an attractive environmental resort, with roads, bridges, cycling routes, residential areas, a business park, the historic Fort Steurgat, boating and strong identity for the Biesbosch natural park (part of the Natura 2000 network) that allow locals and visitors to develop a new idea for how rural infrastructure looks and works. The commitment for Noordwaard to continue to function as agricultural land was supported by the whole project team [16]; however, as some of the land is regularly flooded, the number of farmers in the area has decreased [15], but the remaining farms are now located in one of the most-visited agricultural lands in the Netherlands. The fact that cattle are no longer bred in Noordwaard has minimised the consequences of a major flood; however, each farm is located on its own new artificial mound, as the example in Figure 2 shows. The decision to allow water to flow more freely in Noordwaard, has, on the one hand, introduced new ways to design climate adaptation schemes in the future; on the other hand, it has had an economic and social impact on the agricultural landscape and farmers of the area. Due to the fact that less agricultural land would be available, residents were offered the option to sell their homes at market value before the RftR project started and were supported to find new areas suitable for agriculture. Compensation was given to the farmers who chose to remain in Noordwaard due to the fact that they had to move to higher ground or take specific water safety measures [15].



**Figure 3.** Water Level Diagrams. Left-hand diagram shows the regular flood when water reaches 40–70 cm. Right-hand diagram shows water level with 240 cm of flooding, calculated to occur once every 100 years. Image courtesy of Annika Hesselink and Rijkswaterstaat.

Continuous consultations with landscape and environmental teams, as well as the local farmers, shaped the decisions on what areas are safe and what land can be used for what forms of agriculture. Policy and legislation introduced specifically for the RftR programme have allowed the delivery of several spatial quality elements and supported the creation of a sustainable protection strategy against the climate crisis. Noordwaard is a living example that demonstrates a new way of designing in order to minimise the climate uncertainty, which, at the same time, has created a new concept for agriculture

and given a broader audience the opportunity to connect with nature. The opportunities created by design are demonstrated throughout the project with one of the significant examples being the creation of the 'willow forest', which is a natural protection of the historic Steurgat fortress together with a much lower wave-resistant dyke, without the need of the old concrete dyke. Two species of willow trees have been planted at a particular angle, following a well-thought out design, in order to allow the replacement of the old, high concrete dyke by a lower one while keeping the historic fortress safe. This innovative design demonstrates how the impact on the environment can be minimised while improving quality of space and the way of life for our communities. It is not just a 'design trick' but it is a positive example of how the area of Noordwaard has managed to address the flooding while creating a resilient and more sustainable infrastructure. The continuous communication between the designers, local and national authorities and residents in the area was supported by a project framework especially developed for this area. The flexibility given to the design and management teams, allowed the integration of innovative methods and the delivery of an environmentally friendly scheme that also integrated the overall goals of the RftR programme.

#### 4.2. *The Landscape Charter of Lluçanès*

The Landscape Charter of Lluçanès, a collaborative project of the Landscape Observatory of Catalonia, was created in 2015 as an instrument to focus public and individual stakeholders' actions towards landscape protection and management. It demonstrates the process of a local scheme, which focuses on landscape evaluation and has created significant synergies with key stakeholders. Lluçanès is spread between areas of the wider 'natural region' of the Plain of Vic and Berguedà, in the pre-Pyrenees, making it a challenging geographical location. It is not recognised as an official 'comarca' (county) of the region, even though it has a rich historical, natural and social character that the Charter aims to preserve [11].

Lluçanès was initially established as a consortium with the aim of protecting and managing the landscape, while, at the same time, preserving the qualities and values of the area [11]. The consortium is a collaboration of 13 municipalities around the region that operate under the same umbrella, with a focus on this specific area. The unique landscape character, combining rural areas and cultural elements, has revealed the need for preservation and required the establishment of a project process responsible for implementing a landscape plan. As one of the professionals involved in this process mentioned, the initial conceptualisation phase of the project aimed to secure specific characteristics of this landscape such as 'agriculture', 'urban environment', 'landscape and tourism' and 'learning about the landscape' (Xavier Sabaté Rotés, Interview, June 2015) [11]. These topics formed the core of workshops and activities held by the consortium, aiming to identify and raise awareness about the qualities of the Lluçanès landscape and promote the landscape identity of the area. Following the first phase of work (in 2015), these topics have now resulted in key principles on how to 'live', 'learn', 'enjoy', 'work' and 'share' the landscape of Lluçanès [17]. The Landscape Observatory recognises the Landscape Charters as voluntary instruments, promoted by the government of Catalonia or local authorities with the aim of supporting and promoting actions related to landscape strategies, environmental improvements or assessments [13]. The Lluçanès landscape charter is, therefore, a mechanism that reports on the landscape and environmental impacts of the area, supports the landscape dynamics, sets the quality and environmental objectives for the specific land and is responsible for the management programme being carried through with community engagement identified as a necessary requirement of the various actions. Through the formal structure of the Charter and the several workshops and community engagement events, the consortium of Lluçanès has managed to improve local landscape identity and create stronger links between the locals, residents and their landscape. The strengths of this case study have been in identifying concepts and meanings, such as 'live', 'learn', 'enjoy', 'work' and 'share' that were not recognised at all in the previous years. This has resulted in a major awareness and community exercise on the importance of the rural landscape of Lluçanès, demonstrating how this can be appreciated or taken care of in relation to future infrastructure developments and the environmental

challenges we face. The Lluçanès Landscape Charter draws attention to challenges for farmers, and for agricultural or forest land with the aim to support the area and generate positive outcomes for the whole community.

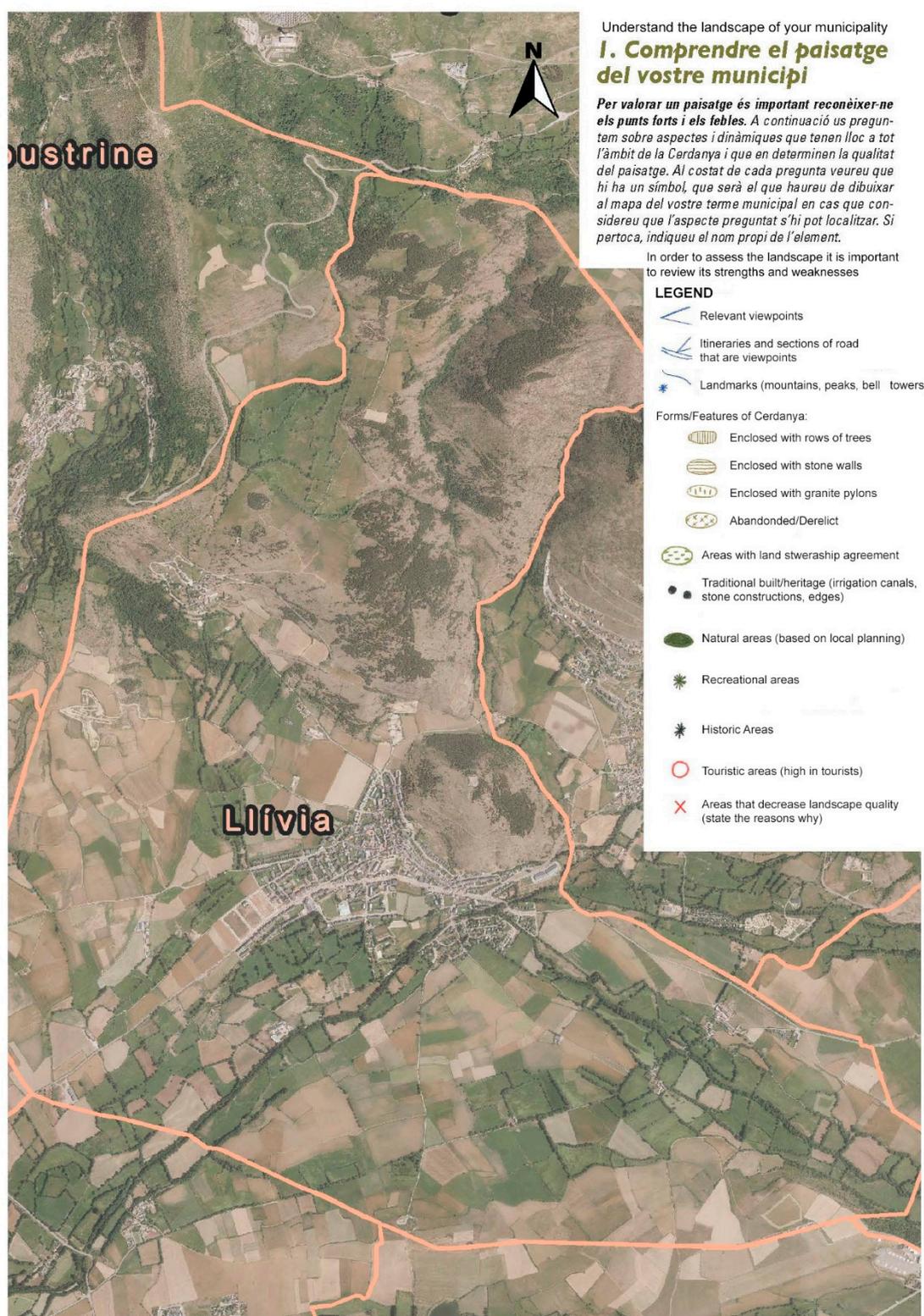
#### 4.3. The Case of La Cerdanya

The landscape strategy of La Cerdanya is a unique collaboration of two regions (Catalan and French), as the area sits on the border of two countries in a valley of the Pyrenees. The project has developed a participation and awareness method in order to enhance the identity of the rural landscape and engage with the different communities involved. It examines the character of La Cerdanya and has developed a way to communicate those elements to the broader public through maps and drawings, encouraging the locals to provide their input and share their knowledge of the area. The environmentalist and landscape architect involved in this scheme, Irene Navarro, has explained that the 'spatial' understanding of sense of place of La Cerdanya is developed through 'quality maps' created in several workshops with designers and locals. Following the initial stages of the project, the Landscape Observatory decided to create a visual map (presented in 2017) that would identify quality characteristics of the area [11], and therefore, support ways to improve how we understand and interpret the landscape, with the aim of improving the understanding of the landscape in the area and supporting the collaboration between the two regions in strategic documents and policy issues on the landscape.

The rich landscape of La Cerdanya, together with the complex geographical borders, requires a 'spatial' understanding in order to encourage new policy and legislation that will preserve the identity of the rural area. The visual diagrams developed have been instrumental in demonstrating the spatial dimension and sense of place, but have also formed a new way of communication between the two national cultures using landscape representation. The methods used for public consultation included maps, drawings and a combination of map/diagrams (Figure 4) where the participants had to locate specific areas or elements of the landscape as required by the design team. The method might sound simple, but it had not been extensively used before in public consultation in Catalonia. The participants are usually asked to draw the area or map its landscape characteristics, and not to locate elements specified by the project team, as happened at La Cerdanya.

The project has resulted in many outputs, with one being the creation of the 'Mapa del paisatge transfronterer de La Cerdanya' (the cross-border landscape map of La Cerdanya), a bilingual drawing which demonstrates the main values and future strategies of the Cerdanya valley. According to the Landscape Observatory [13], the cross-border nature between Catalonia and France makes the 'Mapa' a pioneer drawing in the European context, implementing the aims of the European Landscape Convention. It is also stated that the 'Mapa' of La Cerdanya "promotes landscape as a factor for increasing the feeling of belonging to a region and also as a factor for regional competitiveness and the creation of economic opportunities" [18], exposing the significance of landscape management and awareness not only for the environment, but also for the business and social elements of a region. The work initiated by the Landscape Observatory resulting in the 'Mapa transfronterer' of La Cerdanya is not only significant as a participatory method and a cross-border collaboration, but because it reflects landscape quality objectives [19] allowing for the Cerdanya exercise to become a future territorial project of the area. Combining the necessary technical language together with information from locals and institutions of the area is a valuable output for planning and decision-making exercises as well as a tool for developing landscape awareness.

Another significant gain from this case study is that the 'Mapa transfronterer' was created in collaboration with many local and governmental institutions, such as the Girona Provincial Council, the Cerdanya and Llívia County Councils, the Generalitat House in Perpignan, Pyrenees Regional Natural Park Catalans, Communauté de Communes Pyrénées-Cerdagne, the DREAL Languedoc-Roussillon and the General Council of the Pyrenees Orientales [19], demonstrating in practice how, when working in collaboration, policy and landscape design can contribute to the future of our rural landscapes.



**Figure 4.** Map of Llívia, La Cerdanya. Landscape Observatory. Example of an activity designed for a participation process method in La Cerdanya, where attendees were asked to identify key characteristics of their area. Image courtesy of Irene Navarro; original canvas produced in Catalan (English translation of the legend by authors for the purposes of this paper).

## 5. Discussion: Awareness, Governance, Participatory Methods and Legislation as Ways to Protect Landscape Identity

Governance models, new legislation and communication methods have been identified across all three landscape projects presented in Section 4. The pioneer design of Noordwaard has used its unique rural character and a strong focus on the climate crisis to spread awareness of the landscape in the whole region, while at the same time it has demonstrated how a landscape project can be delivered without compromising on environmental efficiency or quality of space. The fact that a design and decision-making mechanism was put in place to ensure the successful delivery of the project demonstrates that climate adaptation strategies in rural landscapes are possible when a coherent framework is in place. The legislation, developed specifically for this landscape scheme, emphasises the role that governance plays in such activities and has proven that qualities such as ‘climate adaptation’, ‘environmental coherence’ and ‘spatial quality’ can be delivered if a team is prepared to re-evaluate their decision-making and governance processes.

Focusing on economic and social elements, both projects from the Landscape Observatory are known across Catalonia for their innovative participatory processes and landscape management, but are also inspiring neighbour countries and professionals on a global scale. The approach adopted by the Landscape Observatory, which “takes the natural and cultural components [of a landscape] jointly, never separately” [20] is evident in both the Lluçanès and La Cerdanya projects. The reasons why a local scheme such as Lluçanès is relevant to this paper lie in the several successful participatory methods and policies developed in order to allow collaboration of several local authorities, and the fact that such charters are promoted by the government, public and private institutions. The Landscape Charter consortium runs several activities (from educational, schools to tourism) and has managed to demonstrate the value of this unique landscape while preserving its identity. Heritage and tradition are being celebrated but with a focus on the future, allowing entrepreneurial activities and tourism as well as planning for environmental strategies.

Instead of being a merely descriptive map, the ‘Mapa tranfronterer’ combines the technical language necessary for management and planning with drawings and visualisations aiming at the sensitisation of the society and the landscape institutions of the area. Using the knowledge of the society packed with the expertise of landscape architects and environmentalists, the project suggests a territorial plan for La Cerdanya without overlooking the values of the landscape as perceived by locals. The ‘Mapa tranfronterer’ is a useful example of how a holistic landscape vision can infuse future development with sustainable ideas and how such outputs can be guidance for our governmental and local authorities. The endorsement of this project by a wide range of governmental institutions in Catalonia clearly demonstrates how landscape design can lead on environmental approaches addressing climate emergency and supporting the social and cultural characteristics of an area.

## 6. Conclusions

As the climate emergency develops, we need to acknowledge that schemes such as those presented in this paper deliver a strong message about the importance of a multidisciplinary approach to the environmental challenges we face. The conceptual and participatory methods used offer a new way of planning that allows the integration of a climate emergency response in rural landscapes, as it spreads awareness about the value of these areas and the significance that they have in mitigating or adapting to the environmental crisis. The example of Noordwaard demonstrates how agricultural land can be given back to nature and how a co-existence plan can be delivered through careful management, close communication and governance and generate public support.

Strategic management, governance and policy are necessities in order to create synergies between different stakeholders. The methods developed by the Landscape Observatory and its projects have resulted in new processes and proposed frameworks to be followed by their local communities and, in several cases, have changed the decision-making process for politicians and professionals. The focus on the landscape identity has increased the community engagement, resulted in several

collaborative projects in rural landscapes and has changed perceptions about the way in which the Catalan government operates in such a way that there are now several actions around the landscape law (Law 8/2005 by which the Landscape Observatory was created) approved by the Parliament of Catalonia as well as an increasing interest in other territories in Spain such as Law 4/2014 from the Parliament of Cantabria and more. This paper suggests that rural and agricultural infrastructures have a valuable multi-layered identity and can play a strong part in the fight against the climate and social challenges which we face. However, a strong vision, multidisciplinary and specific policy are required in order to allow the landscape and design team to pursue the project concept and create valuable and successful adaptation and mitigation solutions. The examination of the pioneer projects demonstrates that an effective response to the climate emergency is usually accompanied by a strong social and community feeling as well as opportunities for further economic development in the area.

**Author Contributions:** Conceptualisation, A.N.; methodology, A.N., K.M. and P.J.L.; validation, A.N.; formal analysis, A.N.; investigation, A.N.; data curation, A.N.; writing—original draft preparation, A.N.; writing—review and editing, A.N. and P.J.L.; supervision, P.J.L. and K.M. All authors have read and agreed to the published version of the manuscript.

**Funding:** This research was partly funded by EIT Climate-KIC.

**Acknowledgments:** The authors wish to thank EIT Climate-KIC, which has supported this research throughout, as well as all the stakeholders at Noordwaard, the consortium of Lluçanès and La Cerdanya.

**Conflicts of Interest:** The authors declare no conflict of interest. The funders had no role in the design of the study; in the collection, analyses or interpretation of data; in the writing of the manuscript, or in the decision to publish the results.

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